

# **2001 Goldsborough Creek Smolt Trapping Study**

Trap data compilation for the

U.S. Army Corps of Engineers  
Seattle District  
Seattle, WA

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by

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## PROJECT SUMMARY

The U.S. Army Corps of Engineers is in the process of removing the severely deteriorating Goldsborough Dam on Goldsborough Creek. The purpose of this project is to restore creek conditions to pre-dam status and to restore fish passage into the upper reaches of the system. The current fish ladder system at Goldsborough Dam is almost non-functioning and only a few salmonids are able to negotiate it. The dam has an unknown but likely negative impact on migrating smolts.

One measure of the success of this restoration project is the increase in the proportion of smolts originating from the area above the dam. The U.S. Fish and Wildlife Service conducted a study to estimate salmonid (*Oncorhynchus* spp.) smolt production in Goldsborough Creek watershed during spring 2001. This was the second year of pre-dam removal monitoring of salmonid smolts in Goldsborough Creek. For results and information regarding the first year's study conducted in 2000, please see Celedonia et al. (2001)<sup>1</sup>.

We assessed smolt production by using two rotary-screw traps, one above the dam and one below the dam near the mouth of Goldsborough Creek (see Celedonia et al. (2001) for trap locations and trap specifications). We operated the traps 24 hours per day. The lower trap was operated from April 3, 2001, until June 7, 2001, and the upper trap was operated from April 3, 2001, until June 14, 2001. Traps were checked twice per day, once in the morning and once in the late afternoon. All fish were identified to species and counted.

We combined wild fish from both traps over a 2-day period to conduct trap efficiencies. However, in using wild fish, we were only able to conduct trap efficiencies twice on the upper trap and once on the lower trap. We attempted to use hatchery fish for two other trap efficiency tests, but the hatchery fish we used in the early part of the season were not ready to migrate to salt water and remained in the stream throughout the trapping season. However, we were successful in using hatchery fish for a trap efficiency test at the end of the season. This gave us a total of three trap efficiency tests for the upper trap and two for the lower trap.

Tables 1 to 6 on the following pages summarize daily catches, trap efficiencies, and stream discharge information.

<sup>1</sup> Celedonia, M.T., R.J. Peters, and B.R. Missildine. 2001. Pre-dam removal monitoring of Goldsborough Creek, Washington: 2000 smolt trapping study. Misc. report. U.S. Fish and Wildlife Service, Western Washington Office, Lacey, Washington.

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Table 1. Daily catch of salmonids (*Oncorhynchus* spp.) and other species in the lower trap.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
4/3/01	n/d <sup>2</sup>		97	0	0	537	0	1	0	1	0
4/4/01'	n/d <sup>2</sup>		6	0	0	140	0	1	1	0	0
4/5/01	.39		31	0	1	598	0	0	10	2	1
4/6/01	.39		10	0	1	450	0	1	3	2	0
4/7/01	.39		22	0	1	782	0	1	0	3	0
4/8/01	.37		0	0	1	371	0	3	9	1	0
4/9/01	.37		64	0	9	790	0	3	4	1	0
4/10/01	.52		45	0	1	484	0	4	5	0	0
4/11/01	.38		140	0	0	820	0	1	11	1	0
4/12/01	.34		264	1	3	296	0	1	7	2	0
4/13/01	.38	105	97	1	5	513	0	1	4	0	0
4/14/01	.38		121	0	1	307	0	1	8	0	0
4/15/01	.34		200	0	6	415	0	1	3	1	0
4/16/01	.33		148	0	0	327	0	3	8	0	0
4/17/01	.34		101	0	1	394	0	4	5	1	0
4/18/01	.34		277	0	0	629	0	7	5	0	0
4/19/01	.34		321	1	2	745	0	7	10	3	0
4/20/01	.32	94	346	0	0	349	0	1	13	6	1
4/21/01	.30		297	0	1	161	0	7	10	0	1
4/22/01	.30		352	0	2	188	0	2	8	0	0
4/23/01	.38		129	0	2	71	0	4	8	2	0
4/24/01	.39		641	0	3	106	0	6	10	4	0
4/25/01	.33		137	6	6	28	0	13	6	3	0
4/26/01	.30		248	4	6	7	0	12	13	1	0
4/27/01'	.30	81	75	0	0	9	0	0	0	0	0
4/28/01	.30		33	3	3	5	0	6	11	3	0
4/29/01	.37		125	6	8	13	0	4	5	0	0

Table 1. Con't.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
4/30/01	.41		45	9	2	14	0	6	7	0	0
5/1/01	.46	150	2	23	23	1	0	10	5	0	0
5/2/01	.40		9	23	19	0	2	7	9	1	0
5/3/01	.36		8	2	4	0	2	8	5	0	0
5/4/01	.35		5	5	3	0	0	5	8	1	0
5/5/01	.35		4	4	3	0	0	2	8	0	0
5/6/01	.34		4	7	3	0	0	2	4	1	1
5/7/01	.32		0	4	1	0	0	4	7	2	0
5/8/01	.32		5	2	0	0	0	3	0	0	0
5/9/01	.30	78	0	4	3	0	0	4	14	3	1
5/10/01	.30		0	0	4	0	0	6	9	0	0
5/11/01	.24		0	7	5	0	1	9	7	3	0
5/12/01	n/d <sup>2</sup>		7	4	6	53	0	3	15	4	0
5/13/01	.30		3	3	2	26	0	9	6	3	1
5/14/01	.33		1	2	4	1	0	7	6	1	1
5/15/01	.43	154	0	34	71	0	0	25	8	0	0
5/16/01	.46		3	11	29	0	0	12	2	0	0
5/17/01	.38		0	4	29	0	0	10	7	0	0
5/18/01	.36		0	1	20	1	0	3	4	1	0
5/19/01	.35		2	0	15	0	0	5	9	0	0
5/20/01	.34		1	1	11	0	0	3	10	4	0
5/21/01	.32		1	1	10	0	0	5	5	1	1
5/22/01	.31		1	1	10	0	0	7	6	1	0
5/23/01	.32		2	0	3	0	0	4	4	0	0
5/24/01	.33		0	0	0	0	0	0	0	0	0
5/25/01	.33		0	0	16	0	0	12	6	0	0
5/26/01	.41		0	0	7	0	0	9	6	1	0

Table 1. Con't.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
5/27/01	.29		0	1	2	0	0	11	18	2	0
5/28/01 <sup>1</sup>	.30		0	0	1	0	0	0	5	0	1
5/29/01	.29		0	0	7	0	0	3	8	1	0
5/30/01	.29		4	0	5	0	0	4	2	1	0
5/31/01	.27	63	2	1	5	0	0	2	6	4	0
6/1/01	.27		2	1	3	0	0	6	0	0	0
6/2/01	.28		0	0	6	0	0	4	9	1	0
6/3/01	.29		3	1	3	0	0	2	5	4	1
6/4/01	.27		1	0	3	0	0	1	4	0	0
6/5/01	.27		0	0	1	0	0	1	1	2	0
6/6/01	.29		2	0	1	0	0	2	1	0	0
6/7/01	.29		0	0	5	0	0	2	2	0	0
Total <sup>3</sup>			4444	178	408	9631	5	313	415	79	10

<sup>1</sup> Trap was jammed by debris on April 4, April 27, and May 28.<sup>2</sup> n/d = No data taken.<sup>3</sup> Hatchery fish released for trap efficiencies were not included in total fish count.

Table 2. Gage readings and corresponding discharge estimates for the lower trap.

Lower trap	
Gage (m)	Discharge (cfs)
.39	105
.32	94
.30	81
.46	150
.30	78
.43	154
.27	63

Table 3. Number of marked fish released and recaptured, and associated efficiency estimates by date, for the lower trap.

Date	Marked	Recaptured	Efficiency (%)
5/17/01 <sup>1</sup>	25	7	28.0
5/31/01 <sup>2</sup>	183	13	7.1

<sup>1</sup> The efficiency test was conducted with wild fish captured in the upper and lower traps over a two-day period.

<sup>2</sup> The efficiency test was conducted with Minter Creek hatchery stock.

Table 4. Daily catch of salmonids (*Oncorhynchus* spp.) and other species in the upper trap.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
4/3/01	n/d		4	0	0	0	0	0	4	0	0
4/4/01	.17		0	0	0	0	0	0	0	0	0
4/5/01	.15		1	0	0	0	0	0	0	1	1
4/6/01	.17		1	0	0	0	0	0	0	0	0
4/7/01	.15		0	0	0	0	0	4	2	0	0
4/8/01	.12		0	0	0	0	0	0	1	1	0
4/9/01	.12		4	0	0	0	0	0	0	1	0
4/10/01	.12		0	0	0	0	0	1	1	2	0
4/11/01	.18		1	0	0	0	0	0	2	0	0
4/12/01	.12		1	0	0	0	0	0	1	0	0
4/13/01	.12	76	0	0	0	0	0	2	1	0	1
4/14/01	.11		1	0	0	0	0	0	4	0	3
4/15/01	.09		0	0	0	0	0	1	1	2	1
4/16/01	.09		0	0	0	0	0	2	4	0	3
4/17/01	.10		0	0	0	0	0	3	0	0	0
4/18/01	.10		0	0	0	0	0	4	0	0	0
4/19/01	.09		0	0	0	0	0	10	0	0	0
4/20/01	.08	67	1	1	0	0	0	5	5	0	0
4/21/01	.08		1	1	0	0	0	4	1	0	0
4/22/01	.08		0	0	0	0	0	11	2	0	1
4/23/01	.13		0	0	0	0	0	10	3	1	0
4/24/01	.14		0	2	0	0	0	8	3	0	4
4/25/01	.09		0	3	0	0	0	11	5	2	2
4/26/01	.09		0	4	0	0	0	14	4	3	0
4/27/01	.08	63	0	7	0	0	0	14	0	0	0
4/28/01	.09		0	1	0	0	0	8	4	0	0
4/29/01	.12		0	9	0	0	0	5	0	0	0



Table 4. Con't.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
4/30/01	.15		0	5	0	0	0	2	0	1	1
5/1/01	.21	117	0	3	0	0	0	7	0	0	0
5/2/01	.12		0	8	0	0	0	2	0	0	6
5/3/01 <sup>1</sup>	.12		0	14	0	0	0	7	2	0	1
5/4/01 <sup>1</sup>	.12		0	2	0	0	0	2	3	1	0
5/5/01 <sup>1</sup>	.11		0	1	0	0	1	0	3	0	0
5/6/01 <sup>1</sup>	.11		0	1	0	0	0	2	0	0	0
5/7/01 <sup>1</sup>	.09		0	4	0	0	0	3	4	2	0
5/8/01 <sup>1</sup>	.08		0	0	0	0	0	1	0	0	0
5/9/01	.08	60	0	1	0	0	0	5	7	0	0
5/10/01 <sup>1</sup>	.08		0	11	0	0	0	4	4	0	0
5/11/01 <sup>1</sup>	.08		0	3	0	0	0	3	6	2	0
5/12/01 <sup>1</sup>	.08		1	3	0	0	0	2	2	1	0
5/13/01	n/d		0	4	0	0	0	2	2	1	1
5/14/01	n/d		0	3	0	0	0	4	2	0	0
5/15/01	0.21	114	0	0	0	0	0	0	0	0	0
5/16/01 <sup>2</sup>	n/d		0	0	0	0	0	0	0	0	0
5/17/01 <sup>3</sup>	n/d		0	3	0	0	0	3	0	0	0
5/18/01	.48		0	3	0	0	0	15	0	0	0
5/19/01	.46		0	2	0	0	0	9	3	0	0
5/20/01	.45		4	3	0	0	0	12	3	0	0
5/21/01	.45		0	0	0	0	0	11	5	0	1
5/22/01	.44		0	1	0	0	0	13	2	0	0
5/23/01	.46		1	1	0	0	0	10	1	0	0
5/24/01	.41		0	3	0	0	0	28	0	0	0
5/25/01	.41		0	2	0	0	0	27	0	0	0
5/26/01	.44		2	1	0	0	0	19	4	0	0

Table 4. Con't.

Date	Gage height (m)	Discharge (cfs)	Coho fry	Coho smolt	Chinook	Chum	Steelhead	Cutthroat	Sculpin	Lamprey	Stickleback
5/27/01	.40		2	1	0	0	0	17	13	0	2
5/28/01	.40		0	0	0	0	0	8	3	0	1
5/29/01	.41		0	1	0	0	0	7	7	0	0
5/30/01	.41		1	0	0	0	0	7	3	0	0
5/31/01	.38	43	2	1	0	0	0	1	8	0	0
6/1/01	.38		0	0	0	0	0	2	5	0	1
6/2/01	.39		1	0	0	0	0	2	4	1	0
6/3/01	.40		2	0	0	0	0	1	8	2	0
6/4/01	.37		1	1	0	0	0	3	0	1	0
6/5/01	.38		0	0	0	0	0	2	0	0	0
6/6/01	.38		0	0	0	0	0	1	0	0	0
6/7/01	.38		0	1	0	0	0	2	0	0	0
6/8/01	.37		0	0	0	0	0	1	3	0	0
6/9/01	.37		0	0	0	0	0	0	0	0	2
6/10/01	.37		1	0	0	0	0	0	0	0	0
6/11/01	.38		1	0	0	0	0	0	3	1	0
6/12/01 <sup>2</sup>	.39		0	0	0	0	0	0	0	0	0
6/13/01	.40		1	0	0	0	0	1	1	0	0
6/14/01	.38		0	0	0	0	0	2	0	0	0
Total <sup>4</sup>			35	115	0	0	1	367	159	26	32

<sup>1</sup> Gaging station out of order due to construction; gage readings are estimates.<sup>2</sup> Trap jammed by debris.<sup>3</sup> Trap and gaging station moved 500 m upstream.<sup>4</sup> Coho smolts released for trap efficiencies were not included in total coho smolt count.

Table 5. Gage readings and corresponding discharge estimates for the upper trap.

Upper trap	
Gage (m)	Discharge (cfs)
.12	76
.08	67
.21	117
.08	60
.21 <sup>1</sup>	114
.38	43

<sup>1</sup> Gaging station re-established 500 m upstream.

Table 6. Number of marked fish released and recaptured, and associated efficiency estimates by date, for the upper trap.

Date	Marked	Recaptured	Efficiency (%)
5/1/01 <sup>1</sup>	29	5	17.2
5/11/01 <sup>1</sup>	26	8	30.8
5/31/01 <sup>2</sup>	150	37	24.7

<sup>1</sup> The efficiency test was conducted with wild fish captured in the upper and lower traps over a two-day period.

<sup>2</sup> The efficiency test was conducted with Minter Creek hatchery stock.